PLANT IMMIGRANTS

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Genera Represented in This Number.

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PLATE: The Tonka Bean of Venezuela (Coumarouna odorata.)

(NOTE: Applications for material listed in this bulletin may be made at any time to this Office. As they are received they are filed, and when the material is ready for the use of experimenters it is sent to those on the list of applicants who can show that they are prepared to care for it, as well as to others selected because of their special fitness to experiment with the particular plants imported.

One of the main objects of the Office of Foreign Seed and Plant Introduction is to secure material for plant experimenters, and it will undertake as far as possible to fill any specific requests for foreign seeds or plants from plant breeders and others interested.)

The Plant Exploring Expedition to Brazil.

Heretofore the Agricultural Explorers of the office have gone out singly. With the departure of Mr. P. H. Dorsett, Plant Introducer of this Office, Mr. A. D. Shamel, Physiologist of the Office of Pomological and Horticultural Investigations, and Mr. Wilson Popenoe, Agricultural Explorer of this office, a new policy has been inaugurated; that of sending out an expedition of men who supplement each other and can work together in the investigation of any new plant introduction problem which may present itself.

The time required and the large amounts of capital involved in the establishment of a new agricultural industry, make it seem imperative in the future, that the first investigation of any foreign plant culture should be more thorough than it is possible for one man travelling alone to make, burdened as he necessarily is with all the details of travel.

Through the hearty cooperation of Mr. Stubenrauch, in charge of the Office of Pomological and Horticultural Investigations, it has been possible to organize this expedition and send as a most important member of it Mr. A. D. Shamel, the Physiologist of that office, who is without doubt the best equipped man in the world to study the Navel orange industry of southern Brazil.

Mr. Shamel's remarkable discovery that there are at least nine distinct strains or types of the Bahia Navel orange represented in the California orchards has raised the question as to whether or not Mr. William Saunders' importation in 1870 brought in the best Navel in existence at Bahia and whether this remarkable variety has varied in Bahia as it has in California. The investigations of Dr. Lounsbury of Cape Town some years ago revealed the fact that the Bahia Navel orange growers recognize two types of Seville orange stocks and that one is superior to the other.

It is hoped that Mr. Shamel, with the assistance of the other members of the expedition will be able to make a thorough investigation of the matter. So little is known of the plant resources of this great unexplored area of Southern Brazil, that the expedition may be expected to discover new forms of valuable plants which are not in the literature. The high plateaus visited by occasional frosts, and the borders of the large arid regions surrounded by sub-tropical forests are habitats where forms are likely to be found which will be subject to acclimatization in our Southern States.

The rapidly growing *Mate* industry, the wild fibre plant *Caroa*, the myrtaceous fruits such as the *Jaboticaba*, the passifloras, the bamboos, and the rubber plant, *Hancornia*, are a few of the many things which have provisionally been put on the program for investigation.

The expedition goes out fully equipped to get natural size photographs of fruits, and herbarium material, as well as living seeds and plants of everything worthy of introduction and it will confine its attention to the Provinces of Bahia, Rio, Minas, and Sao Paulo.

This must be considered a preliminary study of the gigantic problem of utilizing for American farmers and fruit growers of the Southern States the valuable plants of Southern Brazil, and it is realized that the expedition can do little more than open our eyes to the possibilities there and bring in such valuable plants as the short period of six months allotted to them will permit them to investigate.

David Fairchild.

Apium sp. (Apiaceae.) 35920. Seeds of a wild celery from Quilan, Chile. Presented by Mr. W. F. Wight of this bureau. "A wild celery from south of Quilan, which has more or less the same taste as *Apium graveolens* and can be utilized in the same way. This should prove a very valuable plant. I found it only near the sea." (Wight.) For distribution later.

Berberis spp. (Berberidaceae.) 35923-924. Seeds of barberries from San Martin, Argentina. Presented by Mr. W. F. Wight of this Bureau. Two species of this very ornamental genus from southern Chile, both very low and with ornamental fruits. For distribution later.

Buddleia hemsleyana. (Loganiaceae.) 36001. Seeds from the Royal Botanic Garden, Edinburgh, Scotland. Presented by the Regius Keeper. A central Chinese species related to *B. variabilis*, but differing in its robust upright growth, in its leaves nearly twice as long, and its smaller flowers without orange in the throat. (Koehne, in Gartenflora, 52:169-171, 1903.) For distribution later.

Carica candamarcensis. (Papayaceae.) 35925. Seeds of the mountain papaya from Quillota, Chile. Presented by Mr. W. F. Wight of this Bureau. "These fruits were grown in Quillota and are therefore perhaps as hardy as any to be had in Chile." (Wight.) For distribution later. See also next description.

Carica candamarcensis. (Papayaceae.) 36069. Seeds of the mountain papaya from the Royal Botanic Gardens, Pera-

deniya, Ceylon. Presented by Mr. H. F. Macmillan, superintendent. "A small semi-herbaceous tree with a crown of large coarse palmate leaves, native of Colombia and Ecuador, similar to the papaya, but with fruit only about one fourth the size of the latter. It has been introduced at Hakgala Gardens, Ceylon, in 1880, and is now commonly grown in hill gardens for the sake of its fruit, being often found in a semi-naturalized state about up-country bungalows. The ovoid angular fruit is in season all the year around; though too acid to be used for dessert, it is very agreeable when stewed, and it can also be made into jam and preserves. When ripe the fruit has a pleasant apple-like odor." (Macmillan, Handbook of Tropical Gardening and Planting.)

Castanea sp. (Fagaceae.) 35891. Chestnuts from San Tun Ying, China. "A good quality of seeds of a Chinese chestnut coming from the best chestnut district of north China. This north China chestnut has no value as a lumber tree, being of a low branching, open-headed growth, while the trees do not grow tall, specimens over 40 feet in height being rare. It seems however much more resistant to the bark fungus disease than the American chestnut and it might be utilized in certain hybridization experiments trying to combine the good qualities of both the American and the Chinese parents in one tree. This chestnut loves a well drained, decomposed granite soil, preferably at the foot of hills or of mountains; it also seems quite averse to strong winds and therefore thrives best in well sheltered valleys. In its native localities it is but little cultivated, the peasants being content to plant a few trees here and there along the bases of the hills and on sloping fields and the trees in general look much thriftier when close to rocks and boulders than on fairly level fields. From the nature of the trees and the climate where it grows one might conclude that sheltered valleys in the foothill section of the Rocky Mountain region will suit this chestnut better than any other section of the United States, and some serious attempts should be made to establish it in these regions as a hardy nut-bearing tree. The Chinese roast these nuts in winter time in large open pans in a mixture of sand with some coarse sugar or molasses in it. This treatment gives the chestnuts a glossy appetizing appearance." (Meyer's introduction.) For distribution later. It was at San Tun Ying that Mr. Meyer made his very important discovery of the chestnut bark disease in China, a discovery which may result in an expedition to the chestnut region for the proper study of the

disease in the field by plant pathologists. It has been suggested that this semi-resistant chestnut may form hybrids with our native chestnut which will be sufficiently resistant to make them valuable forest as well as nut bearing trees, and possibly fully resistant species of Castanea exist somewhere in China.

Citrus spp. (Rutaceae.) 35690-700. Plants of citrus trees from the Government Gardens at Nagpur, and the Botanical Gardens, Saharanpur, India. Received from Mr. R. S. Woglum, of this Department. This collection of lemon and citron plants was brought by Mr. Woglum on his return from India, where he went to study the insect enemies of citrus fruits and their parasites. They represent some of the finest Indian oranges, together with a seedless lemon and limes of good quality. For distribution later.

Colocasia sp. (Araceae.) 36057. Tubers of an aroid from Mount Silinda, Melsetter, Southern Rhodesia. Presented by Dr. W. L. Thompson, American Board Mission in South Africa. "An arum, called here 'Amadumbe,' which we prize as a vegetable. I suppose it must be of the same family as the dasheen. This is the best by far, that we have here, though several other varieties are eaten." (Thompson.) For distribution later.

Cotoneaster spp. (Rosaceae.) 35928-932. Seeds from Chile. Presented by Mr. W. F. Wight of this Bureau. Five species of cotoneaster, all bearing ornamental blue berries, and of possible value for hedges in mild-wintered regions. For distribution later.

Coumarouna odorata. (Fabaceae.) 35904. Pods of the Tonka bean from Solorzano Cacao Estate at Borburata near Puerto Cabello, Venezuela. Received through Mr. H. Pittier of this Bureau. "This tree was introduced less than twenty years ago as a tentative shade for cacao. When the first lot came into bearing it was found they were far more productive as a crop than even cacao itself (I was told that last year's crop sold at $500 per cwt. or $5 per pound), so the plantation has been extended along the foot of the hills all around the Solorzano Estate. As a shade tree, the species was not successful; it does not rise high enough to allow good ventilation, and its foliage is too dense. The leaves are smooth and composed of four leaflets on a winged petiole. The flowers are purplish pink and grouped together in short, rounded terminal racemes. There is seldom more than one fruit to each ra-

ceme, an egg-shaped pod, with a smooth resisting, yellowish skin and a fleshy-spongy mesocarp, the flavor of which is rather agreeable to smell and taste. Each pod contains one of the black elongated seeds known as Tonka beans, which contain coumarin, a compound extensively used in perfumery. The native country of the Tonka bean is in the little-known tract of country embracing the headwaters of the Orinoco and the northern reaches of the Amazon River. The Venezuelan annual crop is exported through Ciudad Bolivar, after having gone through a process of curing which consists in soaking beans in rum for about 12 hours and drying them again by exposure to the sun. They then become covered with a thin, white, minutely crystalline coating and so acquire their characteristic perfume." (Pittier.) For distribution later. See halftone plate.

Elaeocarpus bancroftii. (Tiliaceae.) 36046. Seeds of the ebony-heart tree from Brisbane, Australia. Presented by Mr. William Soutter, Secretary and Manager, Queensland Acclimatisation Society. "This is an evergreen tree of the linden family often reaching a height of over 100 feet, and a diameter of over 2 feet. The leaves are simple, the small white flowers in racemes. The wood is hard and durable, light with a darker center, likely to prove useful for sheaves for blocks. It considerably resembles the American lignum vitae, for which, indeed, it might form a good substitute." For distribution later.

Erythrina arborescens. (Mimosaceae.) 36009. Seeds from Darjeeling, India. Presented by Mr. F. W. Popenoe, Agricultural Explorer. "This tree is indigenous to the central and eastern Himalayas, up to an altitude of 7500 feet. In Darjeeling, where there is an occasional snowfall in winter, it seems perfectly hardy, and should therefore, withstand the frosts of southern California and south Florida without injury. As the annual rainfall at Darjeeling is about 130 inches, however, the dry climate of California may not be well suited for it. Attaining a height of 30 or 40 feet, and bearing its brilliant flowers in the greatest profusion, it naturally forms a very prominent feature of the landscape; in fact, it may be said to be the most conspicuous of all plants in Darjeeling. The leaflets are dark green, cordate, sometimes a foot in breadth, and persist while the tree is in flower, preventing the tree from exhibiting the bare appearance so much objected to in most Erythrinas. The flower spikes are often a foot in length, the individual tubular flowers being two inches long and of the most brilliant scarlet.

The effect produced by the tree when in full bloom is nothing short of gorgeous, reminding one, in fact, of the Royal Poinciana. This species is quite frequently placed on slopes or hillsides to prevent the soil from washing away. It is so easily propagated by cuttings that trimmings, when thrown on the ground, will quickly take root and form new trees." (Popenoe.) For distribution later.

Garcinia livingstonei. (Clusiaceae.) 36021. Plants from Government Botanical Gardens, Saharanpur, India. Received through Mr. F. W. Popenoe, Agricultural Explorer. "A small sized tree, with handsome shining foliage. The fruits, which are deep orange in color and about two inches in diameter, are not edible but are produced in such abundance as to make the tree of great value as an ornamental. The chief reason for the introduction of this species, however, lies in the possibility of its being used as a stock for the more tender mangosteen, *Garcinia mangostana*. Temperatures as low as 20° F. above zero have been recorded at Saharanpur; this species should therefore be sufficiently hardy to do well in south Florida and possibly in the warmest parts of California." (Popenoe.) For distribution later.

Ixerba brexioides. (Saxifragaceae.) 35889. Seeds from Wellington, New Zealand. Presented by Mr. E. Clifton, Director, Fields and Experimental Farms Division, Department of Agriculture. "A beautiful evergreen tree, sometimes 70 feet in height, with thick leathery leaves, and flat panicles of white flowers. Considered by Kirk to be the most beautiful tree in the New Zealand flora." (Laing and Blackwell, Plants of New Zealand.) For distribution later.

Litchi chinensis. (Sapindaceae.) 36042. Plants of litchi from the Government Botanical Gardens, Saharanpur, India, received through Mr. F. W. Popenoe, Agricultural Explorer. "The Bedana litchi, famed throughout India. This is supposed to be a seedless variety, as the name indicates, but I am informed on good authority that the seed is usually present, but varies in size according to location and culture, and is sometimes very small. It is a very choice variety, the plants being propagated by layering." (Popenoe.) For distribution later.

Litchi chinensis. (Sapindaceae.) 36066. Plants of litchi from Muzafferpur, Behar, India. Procured through Mr. F. W. Popenoe, Agricultural Explorer. "Rosa litchi."

Muzafferpur is considered to produce the best litchis in India: whether this is due to the superiority of the varieties, or to especially favorable conditions of soil or climate I am unable to ascertain. Certain it is however, that the Rose litchi is one of the best Indian varieties, and on this account it is well worthy of trial in south Florida." (Popenoe.) For distribution later.

Mangifera indica. (Anacardiaceae.) 35903, 36002, 36029-039, 36052-053, 36070. Plants and seeds of mangos from India, Philippines, Portuguese East Africa, and Isle of Pines, including the Carabao and Pahutan from Manila, plants of eleven of the best Indian varieties from Saharanpur and Muzafferpur, India, and the Diamond mango of Beira, thought to be the same as the Lathrop, introduced under numbers 9486 and 9669. For distribution later.

Pistacia integerrima. (Anacardiaceae.) 36065. Seeds from Lahore, India. Presented by Mr. W. R. Mustoe, Superintendent, Government Agricultural Horticultural Gardens. Introduced as possible stocks for the true pistache, *Pistacia vera*. For distribution later.

Prunus armeniaca. (Amygdalaceae.) 35701. Cuttings of an apricot from Monte Porcio Catone, Rome, Italy. Presented by Dr. Gustav Eisen. "It is the handsomest apricot I have yet seen though not the very largest, as this year I have come across a variety of Crisomelo much larger. The 'Monte Porcio Catone' is the most highly colored apricot I have seen, carmine red on one side and the yellow is vivid like that of a peach and not dull as is generally the case with apricots. It is of high flavor, ripens here in the end of June. It is very sweet, the only defect being that the seed is slightly adherent to the flesh, but its other good qualities will make it valuable. As far as I can learn it is a seedling." (Eisen.) For distribution later.

Solanum spp. (Solanaceae.) 35703-868. Tubers of 166 varieties of potatoes collected by Mr. W. F. Wight in Chile, Peru and Bolivia. For distribution later.

Notes from Correspondents Abroad.

Brazil. Minas Geraes. Lavras. Mr. B. H. Hunnicutt writes August 11: "I found in Bahia a number of fruits strange to me that may be worth investigating. One lady spoke of a quince, 'marmello,' that grows in a neighboring

state that is so sweet that one can hardly eat it. She compared it with our pears. Although this is not the season I found the jaboticabas (*Myrciaria sp.*) in fruit and we have made jelly of some of them. I have nine trees on a little place of my own, that were transplanted, most of them being trees already several years old."

Philippine Islands. Manila. Mr. O. W. Barrett, Chief of the Division of Horticulture, writes Sept. 2: "Mr. Wester has sent you personally a lot of 'Marang' (*Artocarpus odoratissimus* Blanco) seeds. I have just had the pleasure of tasting this very interesting and probably potentially important fruit, and find it about the best thing of its kind I have ever tasted. It partakes of the aromatic sweetness of the sugar apple but does not have the objectionable granulations, though the rag is slightly more in evidence. The total amount of edible pulp in one of these large fruits is something quite out of the ordinary. The natives in western Mindanao are very fond of the fruit and are making some attempt to cultivate the tree. It does not seem to be known to Americans thus far. By the way, I have just come across another economic *Artocarpus* (*A. cumingiana* Trec.); the seeds about one-half the size of American chestnuts are roasted or boiled and eaten like peanuts. You will be interested to know that Mr. Wester has just found the mangosteen fruiting in Southern Oriental Negros, the farthest north locality on record. There are vague reports of its occurring still farther north. More interesting still, however, is Mr. Boyle's recent departure for the pomelo plantations of Siam. Though he had some trouble in making connections with Bangkok boats in Hongkong he has already sent us several lots of plants collected in Hongkong and the neighboring mainland; among these a collection of orchids obtained from a wealthy mandarin, including the exceedingly rare black orchid and a large pure yellow species, all terrestrial. Mr. Boyle expects to stop a while in Saigon, and if all goes well, will probably return via Singapore."

Recent Visitors.

Among recent visitors to the Office was Dr. E. C. Joss who is visiting Australia and New Zealand in the interest of the Bureau of Animal Industry of this Department to study the meat inspection service of Australia. He has promised to make every effort to secure for us *Garcinia mestoni*, probably the hardiest relative of the mangosteen, and *Citrus inodorus*, an extremely hardy edible fruited species related to the lime. The Garcinia especially has a large fruit said to be edible. Both spe-

cies grow at elevations of 5000 feet in the edge of the tropics where ice forms more or less regularly.

Mr. H. Godfrey Mundy, government agriculturist and botanist of Salisbury, Rhodesia, called recently. Among the plants discussed were the mahobohobo, *Uapaca sansibarica*, a euphorbiaceous fruit described as a "wild loquat" with a banana flavor, and the elephant grass, *Pennisetum purpureum*, a heavily stooling perennial, always propagated by cuttings or root division, and considered by him as preferable to teosinte. Mr. Mundy reports that the Rhodes grass which is native of Rhodesia does not there make a satisfactory growth and is not used as a forage grass.

Coumarouna odorata. Tonka bean.

As noted in the text this interesting tropical tree of which this photograph by Mr. Pittier is one of the first to be taken, is cultivated in Venezuela for its seeds or so-called "beans," which are utilized solely for the production of a neutral crystalline substance, called coumarin, which is a very strong and lasting perfume used for mixing with other perfumes to give them permanency. It is the same substance which gives the characteristic odor to new-mown hay. Cultivation of the tree has also been attempted in the West Indies, notably in Trinidad, but it is thought that the tree will not be profitable for cultivation in that island, inasmuch as it takes from 10 to 12 years to come into bearing, the tree can not be used for shade for other crops because of its low head and dense foliage, and especially because of the ample supply found wild in the forests of Venezuela. If in time the wild supply should be exhausted the Venezuelan experiments have shown it to be of easy and fairly profitable culture. From photograph by Mr. H. Pittier, Solorzano Cacao Estate, Borburata, near Puerto Cabello, Venezuela.